

## Whistler waves in the upstream region of Interplanetary Shock event on 25 September 2001.

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Whistler waves are considered to play an important role in the electron dynamic for the collisionless shock formation process both at the bow shock and interplanetary shocks (IPSs). Since these two types of shocks differ in the coverage of the Mach number, for example, studies of whistler waves for both shocks are complementary to each other. In this presentation, we analyze IPS events observed by GEOTAIL on 21 February 1994 and 25 September 2001, focusing on whistler wave properties in its upstream region. The part of the results for the former event was reported previously (Shimada et al., 1998).

In the solar wind around 1 AU, whistler waves have the frequencies between ~1 Hz and ~100 Hz, so that we utilize both the high-time-resolution MGF data (1/16 sec sampling) and the search coil data (1/128 sec sampling). Identification as the whistler mode is made through the polarization study of the power spectra of the observed magnetic fluctuations. In both of these two events we have identified the existence of whistler mode waves in the upstream region of the IPS as well as the tendency of the intensity increase toward the shock front. At the same time we have found that the detailed features differed between these two events:

While the intermittent but clear wave bursts were found in the 1994 event, the waves were more or less continuous in the 2001 event. We will discuss the physical origins of the difference of observed wave features taking into account different physical conditions (shock angle, wave propagation direction, etc.),